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Published in:
Education for Primary Care

DOI:
[10.1080/14739879.2015.11494338](https://doi.org/10.1080/14739879.2015.11494338)

Publication date:
2015

Licence:
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Document Version
Peer reviewed version

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):

McKinley, RK., Bartlett, M., Coventry, P., Gay, SP., Gibson, SH., Hays, RB., & Jones, RG. (2015). The systematic development of a novel integrated spiral undergraduate course in general practice. *Education for Primary Care*, 26(3), 189 -196. <https://doi.org/10.1080/14739879.2015.11494338>

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The systematic development of a novel integrated spiral undergraduate course in general practice

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Keywords: Undergraduate education, Primary care, Curriculum, Curriculum development,.

Abstract

In 2007 Keele University School of Medicine rolled out its novel curriculum to which general practice makes a major contribution. In this paper we describe the systematic approach we took to developing the GP curriculum; from the underlying educational principles which guided its development, the subsequent decisions we made to the curriculum itself. This consists of 23 weeks of clinical placements in general practice; four weeks in year 3, four weeks in year 4 and 15 weeks in year 5. We describe the steps which were necessary to prepare for the implementation of the GP curriculum.

We consider that the successful implementation of our general practice contribution is a result of our systematic identification of these principles, the clearly articulated design decisions and the systematic preparation for implementation involving the academic GP team and all our potential teaching practices.

Background

Keele University School of Medicine opened in 2002, initially delivering the Manchester MB ChB Curriculum, with the aim that from 2007 it would deliver a 'distinctive Keele curriculum' which would 'graduate excellent clinicians'.¹ This curriculum would be spiral² and integrated in design, and delivered by a 'hybrid' model of learning methods, from small group interactive (including Problem Based Learning) through to large group and more didactic methods. It would be student centred and include a strong focus on community and primary care contexts,³ the latter reflecting the origins of the University which grew out of the Workers' Education Alliance after WW2 as the University College of North Staffordshire, becoming the University of Keele in 1962. The University has always had strong links with the Potteries and North Staffordshire, communities with long standing problems of poor health status and recruitment of the necessary health workforce. While there are strong local drivers for medical students learning in and with the community, this is in a broader context of primary care becoming an increasingly important resource for medical undergraduate education arising from policy, health service and andragogy.⁴

We were charged with the responsibility of developing the community element of the curriculum. This paper describes the systematic development of our general practice curriculum from 2007 to the present describing the decisions we made and general practice's current contribution to the curriculum. We will present our evaluation of the curriculum in a separate paper.

The Keele context

Keele University School of Medicine is a small school which admits 129 students each year the majority of whom are school leavers: the proportion of school leavers varied from 59% to 93% between 2007 and 2014. It has a five year course and teaches from modern state of the art buildings at the University, its major partner teaching hospitals in Staffordshire and Shropshire and a large body of community partners of which currently 118 are general practices.

The general practice curriculum did not evolve in a vacuum and had to complement the overall curriculum. The initial blueprint for the curriculum is shown in box 1. This demonstrates its spiral nature revisiting knowledge and skills but with greater challenges each time, the integration of nonclinical and clinical learning throughout the five years and with increasing focus on clinical skills as the course progresses.

The general practice curriculum

Design principles: We developed a set of principles to guide development of the general practice curriculum (box 2).

- We believed that the School's clinical curriculum should be more than an exposure to a series of clinical disciplines but a coherent educational experience across the breadth of medical practice. Our approach to maximising coherence was to take what most doctors need to know (as defined by Tomorrow's Doctors 2003⁵ and revised in Tomorrow's Doctors 2009⁶) and teach what general practice can best teach rather than teach general practice as a specialism. This would help address the 'curricular pathologies' of inertia and hypertrophy.⁷
- Primary care is generalist and holistic and therefore ideally placed to provide exposure to a wide range of problems and to help students understand the interplay between clinical, psychological or social effects of illness. Nevertheless, because we would deliver core learning required by most doctors for most of their professional lives, learning would be generic rather than vocational. We would not aim to educate students for a career in general practice but for careers in which general practice would play an increasingly important role irrespective of the discipline they choose to join.
- Increasingly, the doctor's task is to help patients make difficult decisions which are highly context dependent in situations of considerable uncertainty and where there is often no single clear 'best answer'. This requires judgement and highly developed cognitive and interpersonal skills. It is these skills rather than the doctor's knowledge which differentiate patients from their doctors. We wanted therefore to focus on the cognitive and communication skills that would facilitate knowledge transfer and decision making.
- The School aims to deliver integrated learning with the medical sciences and clinical medicine being taught together and all clinical disciplines contributing throughout the curriculum. We did not want to create a division between teaching in primary and secondary care so general practice is seen as an integral part of clinical learning.
- Sustainability is critical. There is no point in delivering a novel curriculum which exhausts general practices leading to delivery of the curriculum becoming unsustainable in the medium or long term.
- While recognising that the community is a resource for the School and its students, we felt it important to highlight that the School and the student body are also a resource for the community. The social compact between medical schools and their communities is increasingly recognised and we believed that we should give something back to the community for its help in teaching our students.⁸

Initial considerations: These principles led to an initial set of decisions (box 3).

1. **A focus on consultation skills.** The consultation is the core of clinical practice ‘and all else in the practice of medicine derives from it’.⁹ All graduating doctors must be able to consult and all clinicians consult throughout their clinical careers. A key element of the development of any skill is sustained deliberate practice^{10;11} supported by feedback on performance.¹² General Practice offers unparalleled exposure to variety and numbers of patients and repeated opportunities for students to practice their consultation skills. Virtually all general practitioners have, as part of their postgraduate training, been supported to develop their own consultation skills and are wedded to the concept of receiving and giving feedback. They are well placed to provide feedback and support the deliberate practice of these skills. General practice is therefore ideally positioned to support the development of the consultation skills which will be needed by most doctors throughout their professional lives.
2. **Consultation skills include clinical reasoning skills.** The ability to make difficult judgements in difficult situations is arguably the medical practitioner’s single most important skill and ‘unique selling point’. Yet the component skills are seldom explicitly taught, their teaching is fraught with difficulty¹³ and many feel that they develop through the accretion of experience.^{10;13} Whether clinical reasoning skills can be taught or not, general practice offers unparalleled exposure to people with ‘new’ presentations with no prior sorting by clinical discipline or pathology so for any presentation the possibilities are constrained only by sex and age. This is rich territory in which to learn and, with ‘sustained deliberate practice’, to start to develop expertise.
3. **Include multi-morbidity and complex and continuing conditions.** As our population ages and the prevalence of multi-morbidity increases, all clinicians irrespective of their discipline will provide continuing care for people with multiple morbidities.¹⁴ It is therefore essential that tomorrow’s doctors develop the skills to manage people with multiple morbidities not only in single episodes of care but to participate in their continuing care, something which needs to be learnt in general practice.^{4;14}
4. **The course would build on the natural strengths of general practices.** Successful general practices are unique, independent small businesses highly adapted to the environments in which they work and responsive to external stimuli. We wished to tap into this creativity and adaptability and not to prescribe how practices would teach. We would define key ‘deliverables’ for the practices but would not specify how they would be achieved. We also offered suggestions as to what

other activities would be appropriate. By maximising flexibility of ways in which practices could deliver teaching, we also maximised their ability to teach long term.

5. **Enable practices to contribute in different ways.** Not all practices can engage in teaching to the same extent. Some want to make a major investment in teaching, reshaping their practices to enable placement of relatively large numbers of students. Others can only make a modest contribution. We wished to support practices which lay at any point on this spectrum, recognising that across the curriculum there was a need for both brief practice visits and longer, more immersive general practice placements. This inclusive, developmental approach meant that there was 'something for everyone' who wanted to contribute.
6. **Put something back.** We set out to identify community partners to ensure that students had an opportunity to make a contribution to the community.
7. **Establish clear descriptors against which GP tutors can gauge progress.** It was essential that tutors knew the School's expectations of students at each stage to gauge progress and to intervene as necessary. RIME¹⁵ (Box 3) is an evaluation framework that offers guidance to GPs on the expected learning outcomes at each year of the course. Unlike other clinical placements, the clinical content of the GPs' caseload is likely to be more consistent from Years 3-5, but what students should master will evolve from being able to describe (report) to understand (interpret) and then to management and finally to an ability to contribute to patient education.

The curriculum: The general practice curriculum splits into 2 major phases: phase 1, years 1 and 2, and phase 2, the major spiral in years 3, 4 and 5 (figure 2).

- Years 1 and 2: In these early years students have a series of half day placements in general practices, hospitals and a broad range of third (voluntary) sector providers. The goals of this programme range from vocation testing, to skills practice in support of learning in the skills laboratory, to the Year 2 SSC when every student works on an advocacy project with a third sector organisation.
- Year 3: Consolidation of Clinical Skills (CCS): This is a four week block at the end of year three after students have spent 24 weeks learning in a predominantly hospital environment and have taken their end of year examinations. The goal of the block is to enable students to consolidate their skills by providing intensive exposure to consultations with patients: they are expected to be involved in 160 consultations and lead 60 during the placement. They receive frequent informal feedback on their consultation skills and a minimum of three formal workplace based assessments (WBAs) supported by written feedback. Assessment and feedback were considered

critical to the success of the whole curriculum and so were piloted from 2008 in the final three years of the Manchester curriculum. Although the block is 'full time', practice based learning is supported by one 'cluster session' each week when students from a cluster of neighbouring practices spend half a day learning together facilitated by a GP teacher from one of the practices. These sessions include a range of activities from peer review of consulting skills using recorded consultations to case discussions to peer teaching. They were not considered a critical element of the CCS block but were considered critical for the year 5 GP Assistantship so we piloted, refined and familiarised students with this learning environment over two iterations of year 3.

- Year 4: Higher Consultation Skills (HCS): The HCS course was originally delivered as five one week slices throughout the year, each set into one of the five hospital placements. Pressures on other areas of the clinical curriculum necessitated a redesign of HCS as a four week block delivering the same content from academic year 2013-14. All students now have two sessions on clinical reasoning during their year 4 induction and then, in each four week HCS block, classroom teaching on Monday with placements in practices to practise their skills from Tuesday to Friday. The classroom sessions cover four major elements: clinical reasoning including clinical error, information management, effective management planning and maximising adherence. Students are expected to conduct 80 consultations and have three WBAs in their practices. The taught content of the HCS course was considered novel and critical and thus was piloted with the last cohort of students on the Manchester course.
- Year 5: GP Assistantship (GPA) and Consolidation of Higher Consultation Skills: this is the most novel aspect of the curriculum. Half of final year (15 weeks) is in general practice. This is an assistantship as described by the GMC in TD2009⁶: students are expected to become part of the practice team and 'to be missed' when they leave. They have a target of conducting 375 consultations seeing patients who have requested 'on the day' consultations as well as people consulting for ongoing care of chronic conditions and health promotion sessions, many on multiple occasions. They work with GPs, nurses, nurse practitioners, health care assistants and other health care professionals providing procedure based as well as consultation based care. They have a series of WBAs throughout the Assistantship and their learning is guided by their GP tutor who is their educational supervisor. They spend four days a week in the clinical environment; the fifth day is split between a clinical cluster session and a cluster project session. The clinical cluster session is similar to the cluster sessions in the year 3 CCS block but serves an important social support

function as well as its educational one. This was considered to be a critical element of the assistantship and was piloted using the year 3 CCS clusters. In the cluster project the group works with a local community organisation to help address a need it has identified. This innovative community engagement offers our students the opportunity to develop leadership and service development skills and to make a real and lasting contribution to the community in which they have been learning.

Preparation for the implementation of the curriculum

We identified a series of challenges which had to be addressed if we were to implement the curriculum successfully:

- ***Developing an agreed consultation skills model:*** If we were to deliver integrated consultation skills teaching we would have to engage teachers in all clinical disciplines and move past the rhetoric of 'that's the way they do it' (substituting general practice or hospital for 'they' depending on context). A vital step was to construct a simple Venn diagram representing consultation skills as overlapping skills. These included 'traditional' clinical skills, communication skills and less commonly included skills such as procedural skills and information management. The aim was to illustrate how all clinical disciplines could contribute to the teaching of clinical and consultation skills and set each in context (fig 1).
- ***Acceptance of a single framework for assessments:*** The next task was to develop a single assessment tool which could and eventually would be used for all assessments of consultation skills whether formative or summative in simulated or real clinical environments from year 1 to year 5. The development of this instrument, GeCoS, is described elsewhere^{16;17} but key to its acceptance was that it was developed and agreed by a group of hospital and general practice teachers, reducing the likelihood of it being perceived as 'the way they do it' in just one specialty. The School-wide skills teaching group adopted GeCoS as the framework for teaching consultation based skills from September 2008 and the School's assessment committee adopted it for clinical summative assessment from 2009.
- ***Development of tools to enable practices to provide written feedback:*** We decided we needed to support practices to formulate written feedback quickly which contained specific suggestions on how to improve.^{17;18} This required the development of specific strategies to improve any of the competences in GeCoS.¹⁷ These were embedded in a web survey and when completed, a summary was automatically sent to the student, tutor and School by email to provide a written record of each work

place based assessment. This has been superseded by a mobile 'app' for academic year 2014-15.

- ***Engage and prepare local general practice to deliver the curriculum:*** We recognised that the curriculum we were constructing would require a large increase in the number of teaching general practices and that the practices would have to change what and how they taught. We started a systematic conversation with practices in May 2007, three years before the first year three students and over four years before the first year five students would be placed, in which we discussed what we wished to achieve and why. We also systematically asked practices how we could design the teaching to make it as straightforward as possible for them to deliver and about their perceptions of their development needs. These discussions continued over two years and informed the development of the detail of the curriculum and the practice teacher development programme which would evolve into an integrated spiral three year program in parallel with the student curriculum.
- ***Developing and disseminating a minimum set of key quality indicators:*** Alongside the engagement of general practices in development of the curriculum, we developed the key performance indicators. These were that practices should facilitate a minimum number of appropriately supervised student consultations, perform a minimum number of work place based assessments and facilitate the appropriate number of cluster sessions (see below) during each placement.
- ***Recruitment:*** We estimated that we needed to increase the number of teaching practices from 66 in 2006 to approximately 110 by 2011, approximately 50% of the practices in Staffordshire and Shropshire. We set in motion a systemic recruitment programme: team members took responsibility for identifying potential teaching practices in a locality and then approaching them to discuss a potential role in teaching, a form of academic detailing.¹⁹
- ***Identification and piloting of critical elements of the curriculum:*** Because general practice was to make a core contribution to the development of our students' clinical skills, the risk associated with the GP placements increased. It became critical that the placements were successful: failure would seriously damage our students' chances of graduating and succeeding in their careers. We therefore identified critical elements of the curriculum and piloted them either within the Manchester course or within the new Keele course before they became critical.

Discussion

We have developed an integrated spiral curriculum which makes a major contribution to the development of students' clinical skills at Keele. Students spend a total of 23 weeks on clinical placements (22% of the clinical placement time in years 3 to 5) in general practice learning core generic clinical skills relevant to medical practice in all specialties. Although the Keele Academic General Practice team has worked to a clearly expressed overall plan, the detailed curriculum was developed in close collaboration with the general practice teaching community; close attention was paid to ensuring it utilised the strengths of general practice overall and of individual practices, minimising barriers to and maximising participation by practices.

There is a long literature concerning the contribution of general practice to undergraduate medical education.^{20;21} This has included thought pieces on what general practice could and should contribute, problems with undergraduate medical education to which it could offer solutions,^{20;22;23} local regional and national surveys of current teaching, future plans and capacity to teach in general practice²⁴⁻²⁷ and descriptions or evaluations of courses which have been novel for different reasons.^{21;28-30} Of these, the most recent development is the longitudinal integrated clerkship (LIC).³¹ The drivers for each innovation are usually multiple but include responses to regulatory pressure, andragogic concerns, evolving health economies, aspirations to change health care provision, regional and local imperatives and institutional aspirations. Long term the most successful innovation has been moving clinical undergraduate medical education from tertiary and secondary centres into primary care which was almost unknown 40 years ago.

General practice now makes disparate contributions to undergraduate teaching in the United Kingdom. At one level this is reflected in the range of the clinical curriculum delivered in general practice (3 to 30, average 13%³²). However total contribution is only one dimension of diversity. Some schools still provide block clinical placements in general practice for 1 or 2 students usually in years 3, 4 or 5, others have longitudinal placements with groups of students learning with practices one day a week over several years, usually in years 1 to 4. Often schools combine longitudinal group placements in early years with block placements of 1 or 2 students in later years. One graduate entry Irish school has a long placement in general practice, based on its original design at Flinders University in Australia, where more longitudinal, community-based models are more common.

The drivers for development of our course include institutional aspirations, andragogical principles and proactive responses to an evolving local health economy in which hospital capacity has decreased. This reflects expected long term changes to health provision in the UK to a more primary care based service which will require both a strong primary care

workforce and a hospital workforce which is more aware of the strengths and skills of primary care. The development of the course was informed and influenced by previous work. The overall organising principle of the Keele course is as a spiral curriculum which has a long history in general³³ and in medical education.³⁴ The staging of learning across the three years is from RIME, a North American evaluation framework.¹⁵ The Higher Consultation Skills course³⁵ in year four is a development of the Clinical Methods Course which has been delivered at Leicester for many years.³³ The original vision for general practice's contribution to the Leicester course was that the Clinical Methods learning would be consolidated with a final year general practice placement. Although never realised, this was the precursor of students consolidating their basic clinical skills in general practice in year 3 and, in year 5, their higher consultation skills. The year 5 placement was further developed using the experience of those who had delivered long term placements in the community and general practice in Cambridge UK,²⁹ Australia³⁰ and N America³⁶ and given fresh impetus by the GMC's Tomorrows' Doctors requirement to provide students with assistantships in their final year.⁶

Our course offers considerable strengths. It has been carefully developed according to, we believe, sound educational principles to provide our students with a future proof undergraduate education which prepares them well for the world of work by providing intensive clinical experience including decision making and patient management. We believe that it prepares our students for a primary care oriented health economy and offers them unparalleled opportunities to develop high order consultation and cognitive skills. Our students will have consulted with at least 525 patients, many under the direct supervision of an experienced clinician before graduation. We are however fortunate. Keele is a new school with little 'educational baggage' and we started with a relatively blank canvas on which to plan. Keele is also a small school and we acknowledge that running this curriculum in a school two or three times our size would be challenging. Nevertheless we do not have privileged access to practices: the ratio of first year medical students at Keele to the population of Shropshire and Staffordshire is 1:8500 while the national ratio of first year medical students to national population is 1:8210^{37;38} suggesting that we do not have access to a much larger population than other UK Schools. Many of our practices had never taught before bringing a freshness to teaching.

Although the course was built to be sustainable, it will evolve with time. For example the fourth year changed from the original one week 'slices' to a single block of four weeks but is offering the same amount of time in general practice. This is part of a wider change in the

architecture of the year to accommodate pressures elsewhere in the curriculum and the essence of the course is unchanged.

We consider that, at Keele, general practice makes a critical and sustainable contribution to undergraduate education. This arises from our systems approach to its design and its horizontal and vertical integration with the rest of the clinical curriculum. Finally it is unique in the UK in the scale of its contribution to clinical learning. We will present the evaluation of the curriculum in a subsequent paper.

Acknowledgements: We would like to thank Clive Gibson, Director of Staff Development for his support of the tutor development programme, Gordon Dent for data on medical student numbers nationally and proportion of Keele students who are graduates, Helen Derbyshire who managed the third sector cluster projects and Janet Lefroy and Adrian Molyneux who did much of the work on the IT underpinning WBA feedback. Finally we would like to thank the practices who helped us with the development of the curriculum and who support our placement programmes and their patients without whom this could not have been accomplished.

Contributions: The overall curriculum was devised by RKM and RBH. RKM led the design and implementation of the curriculum and recruitment of practices and tutor development. RKM and PC initiated the practice liaison and development of the curriculum with practices. RGJ designed and led the year 3 CCS block, SPG and MHB designed, piloted and led the year 4 HCS block. SHG designed and led the year 5 assistantship for its first year before SPG took over this role. PC developed the third sector projects. MHB, PC, SPG, SHG and RGJ led practice recruitment and development in their respective patches and together with RKM delivered central tutor development. The first draft of the paper was written by RKM with all authors contributing to successive drafts and approving the final version.

Conflicts of interest: None of the authors has any conflict of interest apart from the continued success of the course.

Ethics approval: This was not necessary as we have not used any individual student, practice or teacher data in the paper.

Box 1: The initial whole School curriculum blueprint

- Year 1
 - Challenges to Health, 90% non-clinical, 10% clinical
 - An overview year of all aspects of medicine with clinical placements
 - Emphasis on normal structure and function
 - Communication skills
- Year 2
 - Integrated Clinical Pathology 1, 80% non-clinical, 20% clinical
 - A second cycle through several aspects of medicine with clinical placements
 - Emphasis on abnormal structure and function
 - History and examination skills predominately in the skills lab
- Year 3
 - Integrated Clinical Pathology 2, 50% non-clinical, 50% clinical
 - A second cycle through several aspects of medicine
 - Emphasis on abnormal structure and function
 - History and examination skills predominately in the clinical environment
- Year 4
 - Advanced Clinical Experience, 20% non-clinical, 80% clinical
 - Mainly hospital-based
 - Emphasis on clinical learning
 - Final knowledge examination
- Year 5
 - Preparation for Professional Practice, 10% non-clinical, 90% clinical
 - Workplace-immersed FY1 preparation
 - Focus on application of knowledge & to refine skills
 - Final clinical examination

Box 2: Guiding principles for the general practice course:

The course will:

- Teach core learning required by most doctors for most of their professional lives which general practice is best placed to deliver
- Generic rather than vocational teaching
- Predominantly skills and in particular cognitive skills based rather than knowledge based
- An integral part of clinical learning
- Sustainable
- Socially responsible

Box 3 Initial design considerations:

The course would:

- Focus on:
 - Consultation skills including clinical reasoning
 - Multi-morbidity and complex and continuing conditions
- Build on the natural strengths of general practices
- Offer flexibility in the way in which practices can contribute
- Enable students to make a contribution to the community
- Clear and easily communicated descriptors against which GP tutors can gauge progress

Box 3 RIME

RIME¹⁵

- Reporter: The student can reliably report the patient's history and reliably elicit and describe the findings on physical examination
 - End of year 3
- Interpreter: The student can reliably interpret common combinations of symptoms and signs.
 - End of year 4
- Manager: The student can reliably manage common presentations
 - Graduation
- Educator: The student can educate patients about their conditions and manage their own education
 - Still evolving at graduation

Figure 1: Overall consultation skills model adopted by the School¹⁷

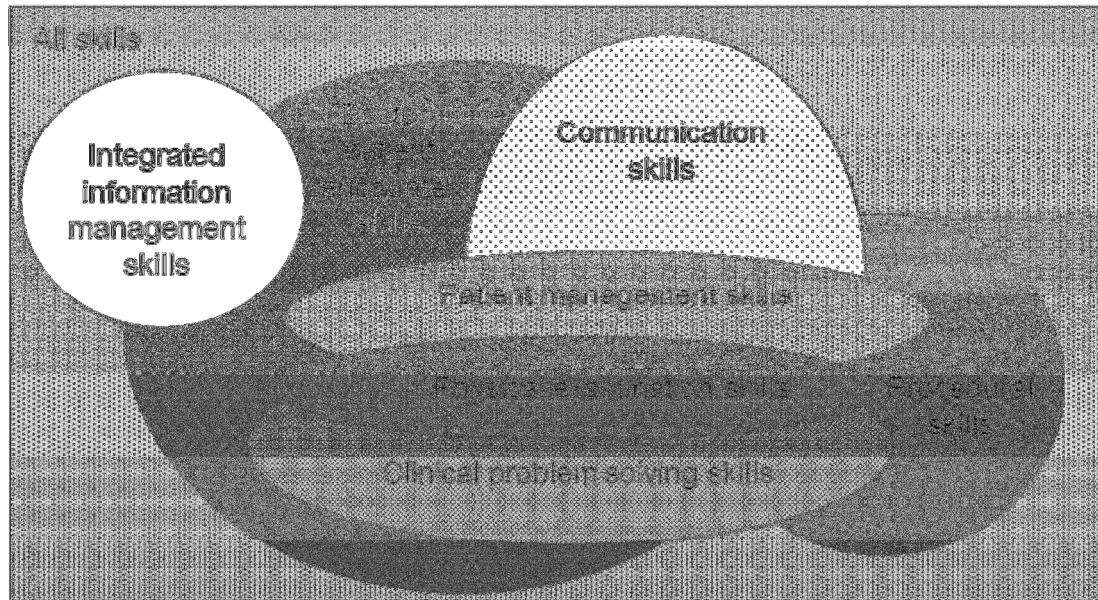
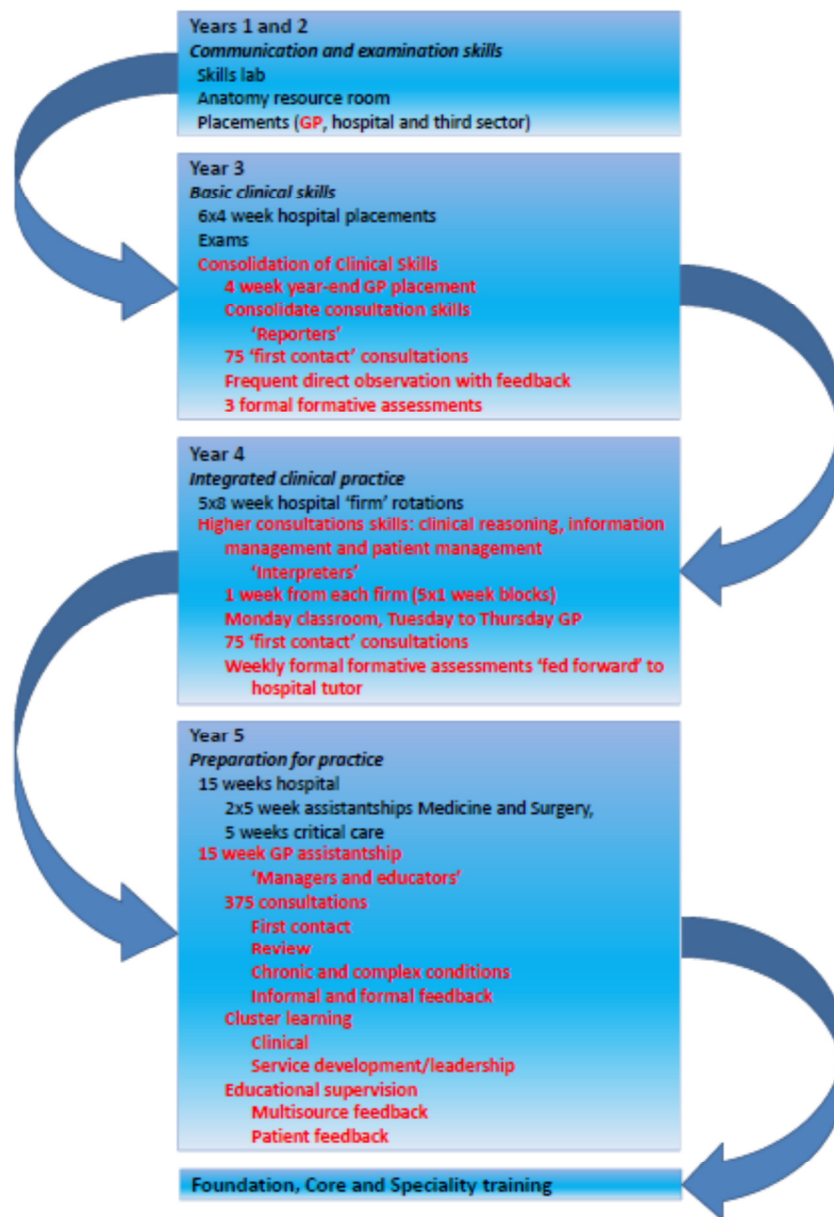


Figure 2: Diagrammatic representation of the GP curriculum within the overall Keele Curriculum: Text in red represents GP contributions)



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